Electrical Power and Machines Engineering Department

Tanta University

Faculty of Engineering

ELECTRICAL POWER SYSTEM (1) EXPERIMENTS

FOR 2ND YEAR STUDENT

2017

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2. **Determination of short transmission line model constants**
3. Performance of Medium Transmission Lines (T-Model)
4. Performance of Medium Transmission Lines (π-Model)
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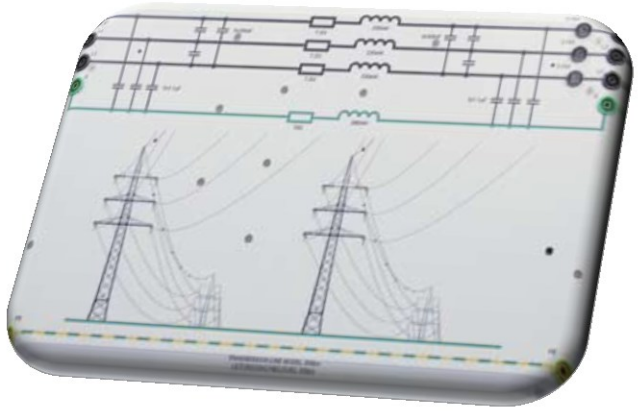
6. Potential Distribution Over a String of Suspension Insulators



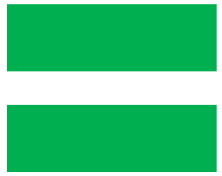
OUTLINES

OBJECTIVES

(WHY ?)

CONNECTION

(HOW ?)



RESULTS

(WHAT ?)

EXP (2)

Determination of short transmission line model constants (A, B, C & D)

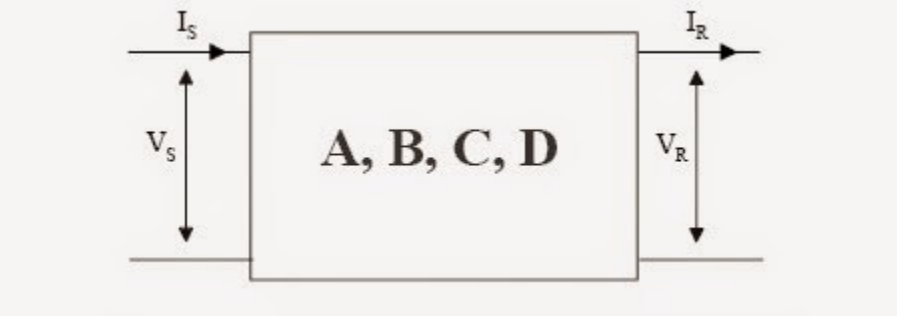
OBJECTIVES

To determine experimentally the magnitude and angle of each of the four **general constants of a TL**

$$V_s = AV_r + BI_r$$

$$I_s = CV_r + DI_r$$

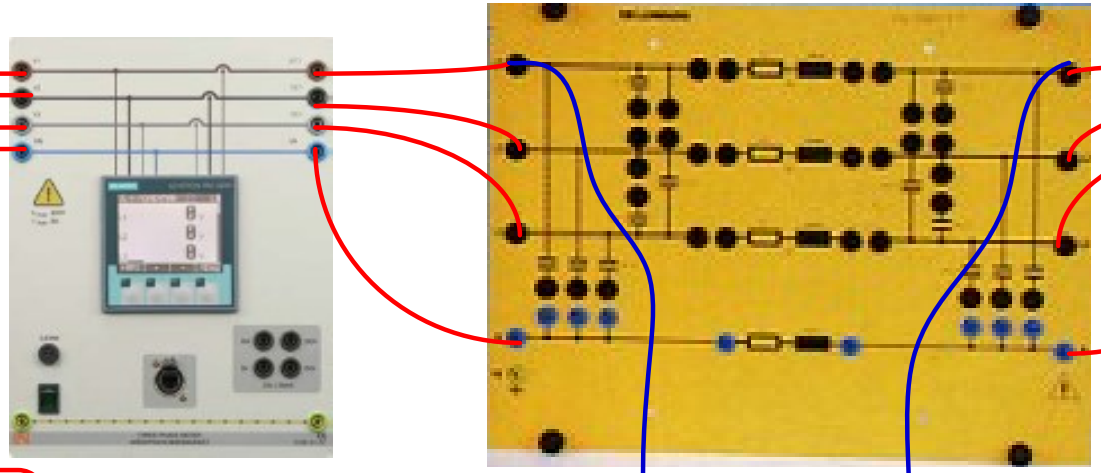
- Two port network: used for simplify the performance analysis of any type of transmission lines.



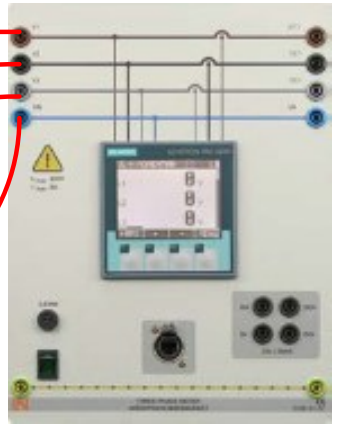
- Useful in designing and simulating power system networks.

CONNECTION DIAGRAM

Open Circuit test

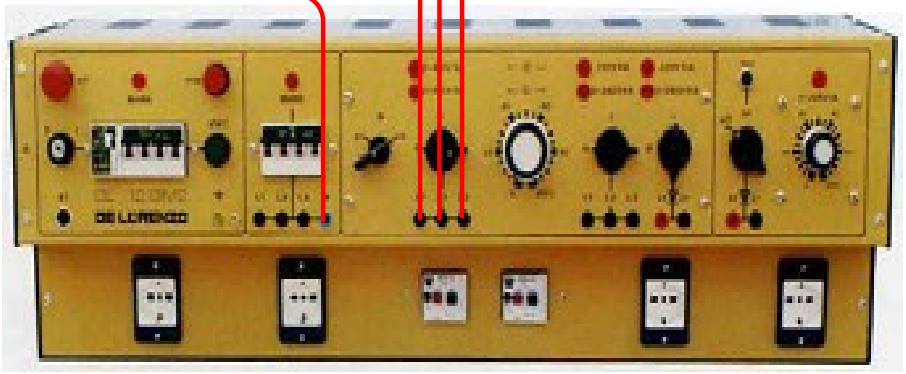


Three-phase meter 1

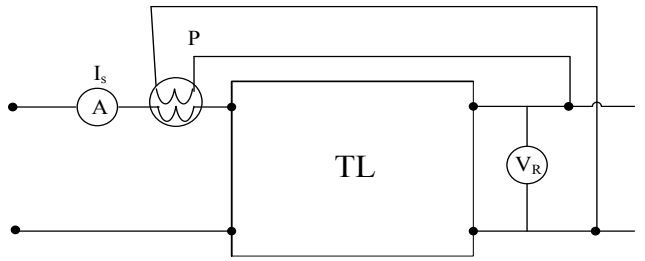


Three-phase meter 2

A, C



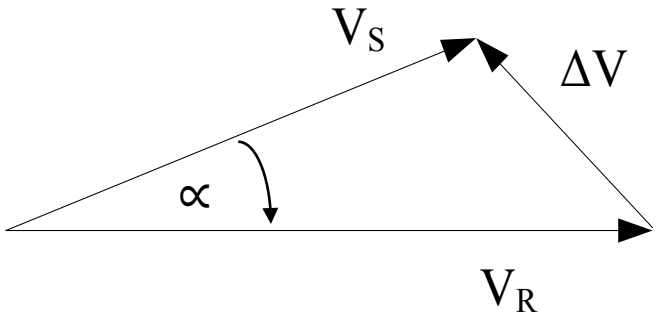
Three-phase Power supply

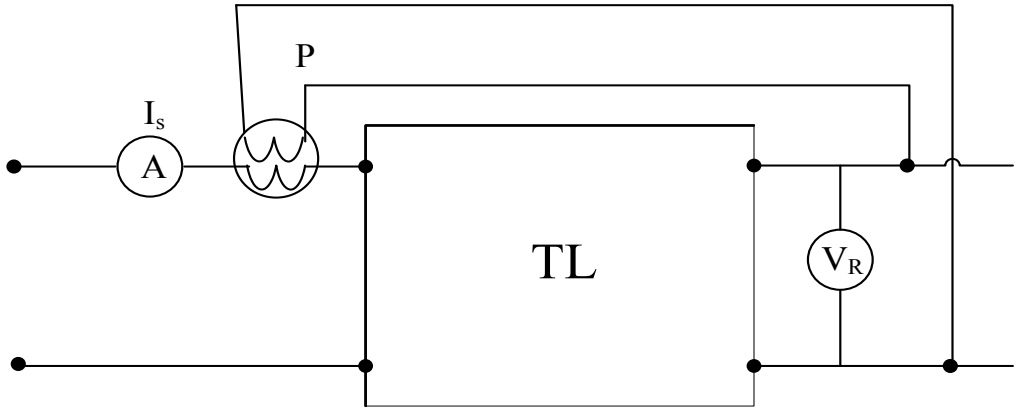


CONNECTION DIAGRAM

Open Circuit test

$$A = \left| \frac{V_s}{V_r} \right|$$



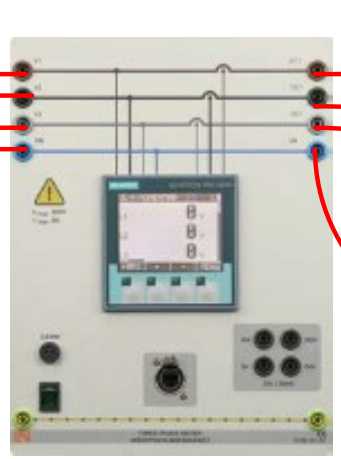


$$|C| = \left| \frac{I_s}{V_r} \right|$$

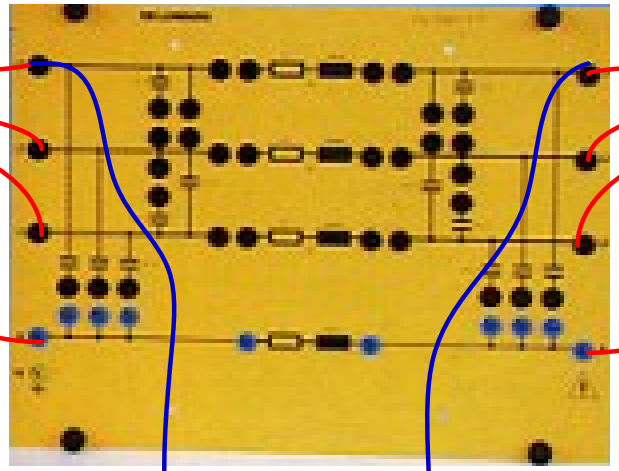
$$\alpha = \cos^{-1} \left| \frac{P}{V_r I_s} \right|$$

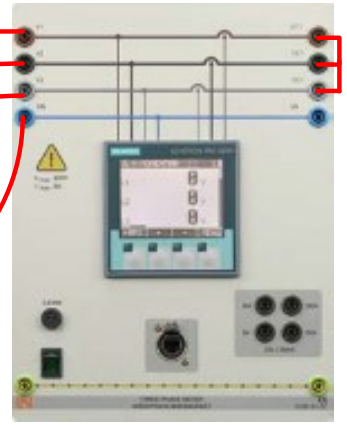
CONNECTION DIAGRAM

Short Circuit test

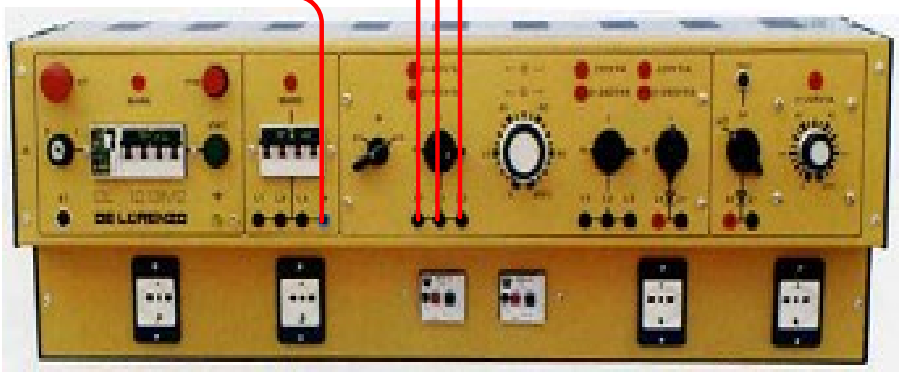


Three-phase meter 1



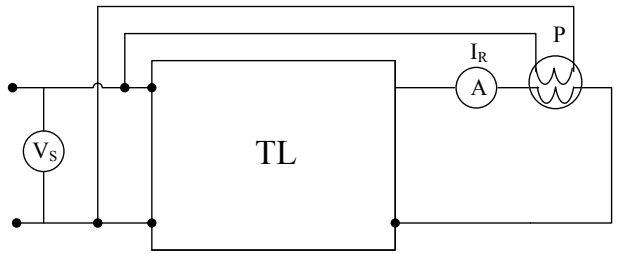


Three-phase meter 2



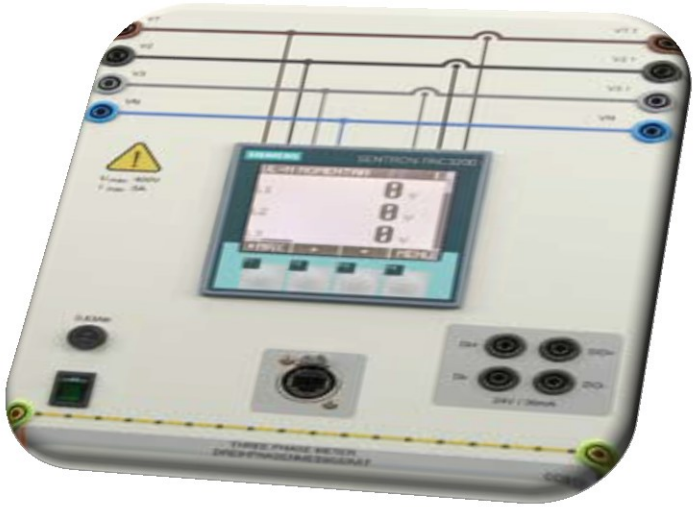
Three-phase Power supply

B , D



RESULTS

A	B (ohm)	C (mho)	D
?	?	?	?

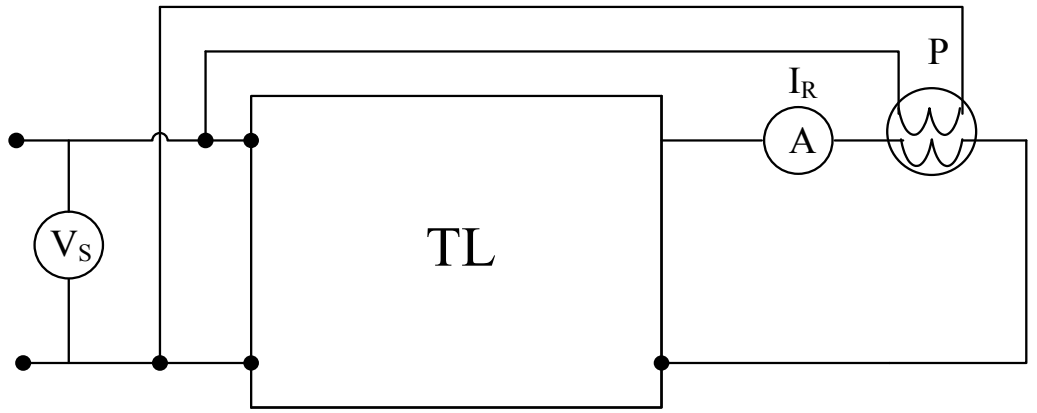


CONNECTION DIAGRAM

Short Circuit test

$$B = \left| \frac{V_s}{I_r} \right| \qquad \beta = \cos^{-1} \left| \frac{P}{V_s I_r} \right|$$

$$AD - BC = 1$$



DISCUSSION

1. Illustrate with connection diagram how you can determine the overhead transmission line constants?
2. Write down the relationships among transmission line constants.

http://www.electrical4u.com/abcd-parameters-of-transmission-line/

EXP.2 RESULTS

- **OC TEST**

Vs V	Ir mA	Is mA	Vr V	Pr W	Ps W	ΔV V
94	0.00	0.00	100	0.00	0.00	14

- **SC TEST**

Vs V	Ir mA	Is mA	Vr V	Pr W	Ps W	ΔV V
32	340	340	0.00	0.00	2.00	-

RESULTS

WHAT DO THE MEASUREMENT RESULTS INDICATE ? !

Comments !!

THANKS